

Claims

1. A method for preparing a beverage or a liquid foodstuff from a capsule containing a product with a substance to be extracted, the capsule having a flexible membrane (17) capable of significant elastic or permanent deformation, comprising the steps of perforating a plurality of holes (26) distributed over the flexible membrane and of injecting water onto the flexible membrane in such a manner that the same deforms in the direction of the product contained inside the capsule and in that the water penetrates into the capsule via said holes, wherein the size of the holes perforated by the perforating spikes is controlled by the level to which the capsule is filled or by the compactness of the product inside the capsule, so as to influence the hydraulic pressure differential ΔP between the two sides (17a, 17b) of the flexible membrane to obtain an automatic adjustment of the compression of the product contained in the capsule.
2. A method for preparing a beverage or a liquid foodstuff from a capsule containing a product with a substance to be extracted, the capsule having a shell (8, 11) forming a rigid container and a flexible membrane (17) closing the open side of the shell and capable of significant elastic or permanent deformation, including the steps of perforating a plurality of smooth holes (26) distributed over the flexible membrane and of injecting water onto the flexible membrane in such a manner that the membrane deforms in the direction of the product contained inside the capsule and in that the water penetrates into the capsule via the smooth holes without them tearing.
3. A method according to claim 1 or 2, characterised in that the flexible membrane is perforated by means of an injection head (3) including a perforating surface (24) provided with a plurality of perforating spikes (25) distributed over the perforating surface and, at least one water supply channel (23) opening on the perforating surface, the perforating spikes having a tapered and smooth shape without any sharp edges.
4. A method according to claim 1, 2 or 3, characterised in that the flexible membrane of the capsule has a shape which is substantially planar and in that the perforating surface of the injection head has a shape which is convex, when viewed

from outside this perforating surface urging the flexible membrane against the product inside the capsule or applying a tensile force to the membrane.

5 5. A method according to one of claims 2 to 4, characterised in that the size of the holes perforated by the perforating spikes is controlled by, amongst others, the level to which the capsule is filled or by the compactness of the product inside the capsule, so as to influence the hydraulic pressure differential ΔP between the two sides of the flexible membrane in such a manner as to obtain an automatic adjustment of the compression of the product, contained in the capsule.

10 6. A device for preparing a beverage or a liquid foodstuff from a capsule containing a product with a substance to be extracted, wherein the device includes an injection head (3) comprising a perforating surface (24) provided with a plurality of perforating spikes (25) distributed over the perforating surface and at least one water
15 supply channel (23) opening upon the perforating surface, the perforating spikes having a smooth tapered shape without sharp edges and an average cone angle less than 60 °.

20 7. A device according to the preceding claim, characterised in that the perforating spikes have substantially the shape of cones with substantially straight line generators.

25 8. A device according to one of the two preceding claims, characterised in that the perforating surface (24) has a shape which is substantially curved and convex, when viewed from outside.

30 9. A device for preparing a beverage or a liquid foodstuff, characterised in that it comprises a body or a capsule carrier (4) comprising a bottom wall (12) and an intermediate bottom wall (6) in the form of a filtering wall having a plurality of perforating spikes (9) and outflow orifices (10), a lower cavity portion (7b) being arranged between the filtering wall (6) and the bottom wall (12), the bottom wall comprising an outflow channel (13) surrounded by lips (14) which protrude upwards with respect to the lowest point (15) of the lower cavity portion (7b).

10. A device according to the preceding claim, characterised in that the upwards protruding lips (14) have openings (16) in the form of slots or of holes enabling the liquid, at the lowest point, to flow out from the capsule carrier.

5 11. A device according to one of claims 6 to 8, including the additional characteristic features of claims 9 and 10.

12. A capsule for the preparation of a beverage or of a liquid foodstuff containing a product with a substance to be extracted, wherein the capsule comprises a shell
10 which is substantially rigid and which is formed by a side wall (8) and a bottom wall (11) to provide a container in which the product is contained, the shell further comprising an annular flange section (18) extending substantially in a radial plane R, the capsule further comprising a flexible membrane (17) bonded or welded to the annular flange section (18), the membrane and the shell being made from one or
15 several polymers and the flexible membrane (17) being made from a multiple layer sheet.

13. A capsule according to the preceding claim, characterised in that the shell and the membrane are made from a polypropylene.

20 14. A capsule according to one of the two preceding claims, characterised in that the flexible membrane is made from a sheet comprised of at least five layers.

15. A capsule according to one of the four preceding claims, characterised in that
25 the flexible membrane (17) has a shape, which is substantially planar, before the use of the capsule.

16. A capsule according to one of the preceding claims, characterised in that the side wall (8) of the shell of the capsule has a shape, which is substantially conical,
30 whereby the diameter of the cone decreases from the annular flange section (18) in the direction of the bottom wall (11).